

A METHOD OF TRANSMITTING INFORMATION TO A TELEPHONE TERMINAL UNIT VIA AN ANALOG LINE, AND TELECOMMUNICATIONS EQUIPMENT APPLYING THE METHOD

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The invention relates to a method of transmitting information from a telephone network to which a telephone subscriber terminal unit, such as a telephone terminal, for example a telephone, or a shared installation, in particular a master station, serving a few telephone and/or mobile telephone terminals, is connected by one or 10 a few analog telephone lines, to communication and information processing hardware and/or software means in the terminal unit.

Information transmitted to a telephone subscriber terminal unit, in particular a telephone, from a 15 telephone network exchange via an analog telephone line connecting the unit to the exchange is primarily transmitted in the form of analog signals constituting tones or tone combinations. This is known in the art. The tones or tone combinations convey little information 20 because the user must be able to interpret them immediately on hearing them; they are used to signal execution or non-execution of a command, for information only. Also, the same tone may be used for two different purposes, for example for a wrong number and for a busy 25 line, which leads to ambiguity for the user and for a tone detector in a terminal unit.

It is also conventional to send a telephone subscriber terminal unit information from the local telephone exchange of the unit via an analog telephone line in the form of a recorded announcement, in 30 particular following a command sent to the exchange from the unit. However, a telephone subscriber terminal unit is not usually able to interpret or use a recorded announcement or any other information taking the form of 35 a voice signal.

This is a serious disadvantage if action has to be taken at a terminal unit, during an operational sequence,

in particular through the intermediary of its hardware and/or software action means and at the instigation of the local exchange of the unit, for example in the context of an operation initiated in the unit, usually following a request from a user. This is the case in particular if a user calls on an additional service accessible via the telephone subscriber terminal unit to which he has access, in particular if the operations to be carried out may differ according to the situation encountered.

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The invention therefore proposes a method of transmitting information to a telephone subscriber terminal unit having hardware and software information processing means for managing it, such as a telephone terminal or a master station of a shared installation serving a few telephone terminals and/or mobile telephone terminals, from a telephone network to which the terminal unit is connected through a local exchange and via one or a few analog telephone lines.

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According to one feature of the invention, there is provision for sending command and/or information messages from the local exchange of the unit to the management logic unit that the information processing means of the destination unit includes, in addition to sending speech signals and signaling in the conventional way between said exchange and said unit, each message being coded so that it can be transmitted from the exchange to the unit by an analog telephone line and transcoded in the unit in order to be interpreted therein. According to the invention, sending command and/or information messages to a telephone subscriber terminal unit from the local exchange of that unit follows a command effected by a user through the intermediary of the telephone terminal unit through which that user communicates.

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According to the invention, the messages are messages whose content is intended to be at least temporarily stored at the unit that receives them.

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According to a variant of the invention, the messages sent are command transmission messages.

The invention also provides telephone equipment adapted to implement the method.

It provides in particular a local exchange for a telephone network which is connected by analog telephone lines to telephone subscriber terminal units having respective hardware and software information processing means for managing them, and in particular telephone terminals and/or master stations of shared installations serving telephone terminals or mobile telephone terminals.

According to one feature of the invention, said exchange includes hardware and software means enabling it to send command and/or information messages to the management logic unit of the information processing means of a telephone terminal unit in addition to sending speech signals and signaling in the conventional way between said exchange and said unit, each message being coded so that it can be transmitted via an analog telephone line from the exchange to the unit.

The invention also provides telecommunications equipment, of the telephone subscriber terminal unit type, including hardware and software information processing means for managing it and adapted to be connected by at least one analog telephone line to a local exchange of a telephone network.

According to one feature of the invention, the telephone subscriber terminal unit type equipment includes hardware and/or software means for communicating and processing information enabling it to receive command and/or information messages from the local exchange via an analog telephone line in addition to speech signals and signaling transmitted from said exchange, said messages being decoded on arrival into a form that can be used by management logic in the information processing means so that it can be exploited.

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The invention, its features and its advantages are explained in the following description, which is given with reference to the accompanying single figure.

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5 The figure is a block diagram of a telecommunications system showing various telephone subscriber terminal units connected to a local exchange of a telephone network by analog telephone lines. The units and the exchanges to which they are connected are adapted to implement the method according to the
10 invention.

15 The method in accordance with the invention of transmitting information is intended to be used in the context of a telecommunications system enabling telephone and/or mobile telephone calls to be set up; the single figure shows one such system diagrammatically and by way of non-limiting example.

20 This kind of system includes as a minimum a telephone network 1 for connecting diverse telephone subscriber terminal units which are connected for this purpose to interconnected telephone exchanges 2, 2' of the network 1 via analog telephone lines L.

25 The telephone terminal units are hardware units made available to users and can be highly diverse, as schematically indicated in the figure. Terminal units
30 are shown by way of example that consist of telephones 3 individually connected to a local telephone exchange 2 by an analog telephone line L. Also shown is a terminal unit of a shared telephone installation 4 which constitutes a master station 5 for that unit and which is connected to a local telephone exchange 2 by a telephone line L or possibly by a few telephone lines. The terminal unit that constitutes the master station 5 of the shared telephone installation serves a plurality of telephone subscriber terminals 3' which are compatible
35 with each other and here are symbolized by telephones. This kind of unit is adapted to enable the users of the terminals which share it to communicate with other

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telephone or possibly mobile telephone terminals via the telephone network 1 or via the analog telephone line or lines L serving the installation. In the non-limiting example given here, the master station 5 includes

5 information processing means, which are symbolized by a management logic unit 5D associated with switching means 5C. The switching means can connect the telephone terminals 3' that the unit serves to its local exchange 2 via the analog telephone line or lines L that connect it 10 to the exchange. This is known in the art. As is also known in the art, the switching means 5C can be particularly compact if the terminals 3' are connected in parallel to a line; they are more generally of a type with "n" terminal ports and "m" line ports, where n and m 15 are positive integers.

The master station 5 can serve cordless telephones if it is provided with radio transceiver means enabling it to communicate selectively with the handset of a cordless terminal, for example; the handset is usually 20 provided with a built-in dialing keypad. This is also known in the art.

Another example of a terminal unit is shown and consists of a main mobile telephone unit 7 of a shared installation serving accredited users having mobile 25 telephone terminals 8, for example cordless telephones, such as DECT, CT0 or CT1 cordless telephones, or mobile telephones, such as GSM or other telephones.

The unit 7 includes switching means 7C for selectively connecting one of the accredited mobile 30 terminals 8 connected to it to the telephone line L (or to one of the telephone lines L) to which it is connected. It also includes a management logic unit 7D enabling it to operate on the switching means 7C in particular, as a function of the needs of users and what 35 resources are available. The unit 7 further includes mobile telephone transceiver means 7A and interface means 7B to enable interworking of the transceiver means with

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the switching means 7C under the control of the management logic unit 7D. Operation is more particularly dependent on requests received by radio from accredited mobile telephone terminals or from the local telephone exchange 5 via an analog telephone line L. Access to the telephone network by mobile telephone terminals via the unit 7 is enabled for accredited terminals 8 which are in the mobile telephone coverage area of the unit 7 and are validly located near it, for example in the manner that, under different conditions, some of them are near a base station of the mobile telephone network 6.

In one embodiment, the accredited mobile telephone terminals 8 are user terminals of the same organization, such as a small company, which has a master station 7 to meet its needs. The accredited terminals are then likely to be standard mobile telephone terminals of a mobile telephone network offering services to the public. They report their location to the master station 7, when they are in its coverage area, in order to be able to communicate by telephone with all users to whom the telephone network 1 provides access. Outside that area, the mobile telephone terminals 8 are used in the conventional way, once they have been individually located by one of the base stations of the public mobile telephone network, within whose radio range they are situated at the time.

Regardless of the telephone subscriber terminal unit concerned, and as already indicated, the local exchange to which the unit is connected is able to transmit information to it in the context of exchanges of messages between their hardware and/or software communication and information processing means 2D and 5D or 7D, in addition to transmitting analog or digitized speech signals and telephone signaling, which is usual between this kind of unit and the exchange to which it is connected.

The messages are formatted so that they can be used directly by the information processing means that receive

them. They are coded in a manner that enables an analog telephone line to transmit them and the receiving telephone terminal to receive them and interpret them. A terminal unit is therefore necessarily equipped with appropriate decoding means, which may already be included in the unit for other purposes. Decoding means, not shown here, are provided at a line interface level and connected to information processing means, for example a processor, in the terminal unit that includes them, whether the latter is a simple terminal, such as a telephone, or a complex equipment unit such as a shared installation master station or a telephone exchange. This is known in the art.

The messages are transmitted in the V23 or DTMF code, for example, and the receiving terminal unit is equipped with transcoding means, known in the art, for translating them into a conventional binary code that can be used by the processing means of the unit, such as the management logic units 5D and 7D.

Messages of the above kind that can be exploited directly are provided in particular to enable the local exchange of a telephone subscriber terminal unit to respond by means of a message commanding action on a service request, such as dialing a party or activating an additional service. That operation is then effected by or by means of the terminal unit, at the instigation of a user served by that unit. These action command messages can be used in particular after processing them in the unit which receives them, for example in its management logic unit 5D or 7D, to initiate immediate or deferred action in the unit or, where appropriate, in one or more of the terminals that it connects to the telephone network.

One embodiment transmits messages intended to be displayed on the screen of the terminal unit itself, for example if that unit is a telephone with a screen, or a terminal served by that unit, if the latter is of the

shared installation type. For example, there is provision for transmitting and/or displaying messages reflecting acceptance or rejection of a service request submitted by a telephone subscriber terminal unit to the telephone network at the instigation of a user of said unit. There is also provision for transmitting and/or displaying information messages on the screen of a unit or of a terminal that it serves, in particular in the event of an error or a fault in the network, for example relating to a request for a particular operation from the unit to its local exchange. There is in particular provision for being able to transmit command or information messages from a local exchange to a telephone subscriber terminal unit at the time of an operation such as conditional call set-up as and when characteristic stages in its progress occur. There is provision for displaying specific error or malfunction information messages if a called telephone or mobile telephone terminal is busy, if there is traffic congestion temporarily preventing a called user from being reached, or if an unassigned or inappropriate call number is sent by a terminal unit to its local exchange at the instigation of a user of said unit. Of course, display on a screen is merely one particular option, and it is equally possible to use means for transforming the signals to be displayed into the form of acoustical signals produced by synthesizers, for example, or stored in the form of pre-recorded messages, in particular for blind users.

There is further provision for associating the transmission of information through the intermediary of this kind of message via a telephone line with a tone or a particular voice message sent via the same line either beforehand or possibly afterwards.